INFORMATION DISCLOSURE CITATION IN AN APPLICATION (Use several sheets if necessary)	Docket Number (optional) AMPC 5053 Applicants: S. Richard F. Sims and William C. Pittman Title: Weather-Agile Reconfigurable Automatic Target Recognition System	Application Number: Filing Date: Group Art Unit 3662

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
[illegible]	A	6,535,647 B1	Mar 18, 2003	Glen Patrick Abousleman	~~382~~	~~253~~	
[illegible]	B	6,347,762 B1	Feb 19, 2002	S. Richard F. Sims et al.	244	3.17	
[illegible]	C	6,111,241	Aug 29, 2000	James E. English et al.	~~250~~	~~203.2~~	

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

[illegible]	D	"Image Metrics for Clutter Characterization," by Kameswara Rao Namuduri, Karim Bouyoucef and Lance M. Kaplan; IEEE Proceedings of the International Conference on Image Processing, Vol. 2, September 10-13, 2000, pages 467-470.
[illegible]	E	"SAR and HSI Data Fusion for Counter CC&D," by Su May Hsu, John P. Kerekes, Hsiao-hua Burke and Steve Crooks; The Record of the IEEE 1999 Radar Conference, April 20-22, 1999, pages 218-220.
[illegible]	F	"The Fusion of Different Resolution SAR Images," by Mario Costantini, Alfonso Farina and Francesco Zirilli; Proceedings of the IEEE, vol. 85, No. 1, January 1997, pages 139-146.

EXAMINER GREGORY	DATE CONSIDERED 3/15/05

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Note: This form is copied from the USPTO Form PTO-1449 and is being used in lieu thereof.

INVENTORS: S. Richard F. Sims and William C. Pittman

TITLE OF INVENTION: Weather-Agile Reconfigurable Automatic Target Recognition System

INFORMATION DISCLOSURE STATEMENT

A) U. S. Patent 6,535,647 B1 teaches compressing hyperspectral imagery by using differential pulse code modulation (DPCM) for spectral decorrelation while an adaptive 2-D discrete cosine transform coding scheme is used for spatial decorrelation. This provides compression of hyperspectral imagery in both the spectral and spatial domains with a moderate degree of complexity and maximum fidelity of the reconstructed image.

B) U. S. Patent 6,347,762 B1 teaches a multispectral-hyperspectral sensing system that comprises a control center, a surveillance platform and at least one weapon battery with known sensing and destroying capabilities. The control center coordinates target information flow between the surveillance platform and the weapon battery so as to increase the level of precision of the strike against the selected target. The information coordination consists of taking hyperspectral information from the surveillance and condensing it to the specific broadband used by the weapon seeker.

Unlike above invention, instant invention is weather-agile in that dissimilar sensors suited for best function in dissimilar weather conditions can be used on the surveillance platform and on the weapon seeker. The use of synthetic aperture radars enables detection of targets in fog and rain and other visually obscuring weather while electro-optical sensors work best in fair weather.

C) U. S. Patent 6,111,241 teaches a weapon sensor that combines laser semi-active sensing with two-dimensional infrared focal plane array sensing to provide the correlation of the temporal returns of the former with the spatial laser returns of the latter to allow the last pulse return indicative of the true target to be identified on the infrared focal plane array. The focal plane array on the surveillance platform observing the same scene can provide a confirmation of the true target return to the weapon.

D) Namuduri, Bouyoucef and Kaplan report a clutter complexity metric that measures the extent to which objects in the background scene are target-like. The purpose of the metric is to establish a bound on automatic target recognition (ATR)

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INFORMATION DISCLOSURE STATEMENT

(continued)

performance as a function of the complexity metric by performing the following steps on a database of images:

(1) Characterizations of ATR performance bounds,
(2) Development of a clutter complexity metric as the incorporation of weighted image processing features that correlate with the ATR performance bounds over an appropriate subset of imagery,
(3) Validation of clutter metric using real ATR performance, and
(4) Refinement of the metric using different image processing features.

E) Hsu, Kerekes, Burke and Crooks report an approach to fusing synthetic aperture radar (SAR) and hyperspectral image (HSI) data sets over the same area. Co-registration of the images was accomplished using references to terrain features. The fusion results showed the detection of a vehicle under a camouflage net and a significant reduction of SAR false alarms.

F) Costantini, Farina and Zirilli report a method of fusing SAR images of different resolutions of the same scene. This method can be used in cases where the surveillance SAR has the higher resolution sensor and the weapon SAR has the lower resolution sensor. By fusing the higher resolution surveillance sensor with the lower resolution weapon sensor, a better match between the sensors is achieved.

None of the above references, whether singly or in combination, teaches applicants' weather-agile automatic target recognition system.

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